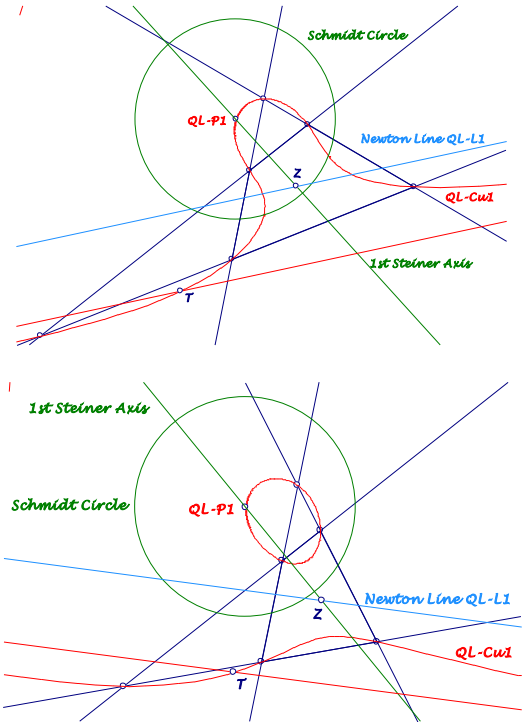
EQF-Note 2014-02-08

Background for these notes is:
Chris van Tienhoven: Encyclopedia of Quadri-Figures
http://chrisvantienhoven.nl/

Pendant to *QL-2P2*

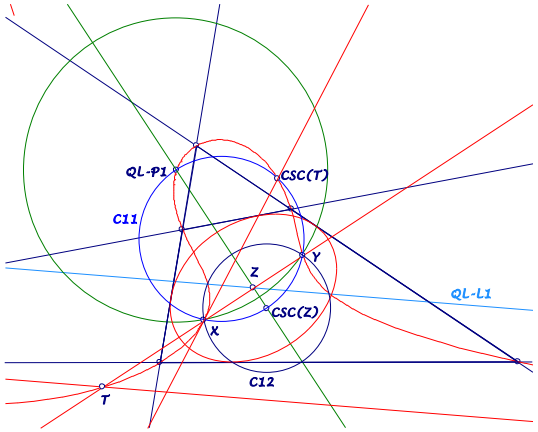
QL-2P2 is a pair of foci of an inscribed conic, centered in the intersection of the Newton Line QL-L1 and QL-L6. Here we discuss the foci of an inscribed conic, centered in the intersection of the Newton Line and the 1st Steiner Axis (see QL-Tf1). It is a comparison of the geometry of the cubic QL-Cu1 in the unipartite and bipartite case.

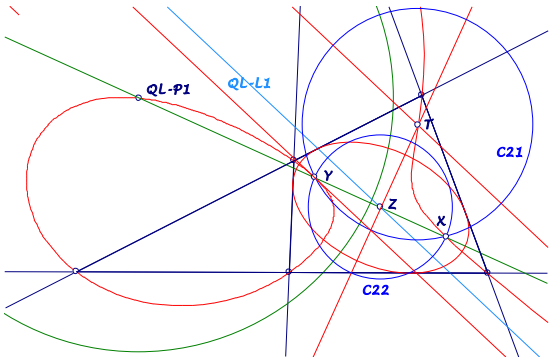


First remarks: The 1st Steiner Axis is the angle bisector at the Miquel Point *QL-P1* wrt two opposite vertices of the quadrilateral. The Schmidt Circle is a circle round *QL-P1*, radius geometrical mean of the distances of *QL-P1* to opposite vertices (see *QL-Tf1*). The reflection in the 1st Steiner Axis, followed by a reflection in the Schmidt Circle is the Clawson-Schmidt Conjugate *QL-Tf1* (shortened *CSC*). Considering parallels *L* to the Newton Line, the *CSC*-image circles of *L* cut the reflections of *L* in the Newton Line on a cubic *QL-Cu1*, locus for the foci of inscribed conics of the quadrilateral. The cubic *QL-Cu1* is unipartite, if the Newton Line cuts the 1st Steiner Line inside the Schmidt Circle, and bipartite, if the intersection is outside. The asymptote is a parallel to the Newton Line through the reflection of the Miquel Point in the Newton Line. The asymptote cuts *QL-Cu1* in *T* on the tangent of *QL-P1*.

Foci on *QL-Cu1*

- Let *Z* be the intersection of the Newton Line *QL-L1* and the 1st Steiner Axis. *Z* is the center of an inscribed conic:
  … unipartite: The minor axis is the 1st Steiner Axis, the main axis cuts *QL-Cu1* in *T* on the asymptote.
  … bipartite: The main axis is the 1st Steiner Axis, the minor axis cuts *QL-Cu1* in *T* on the asymptote.





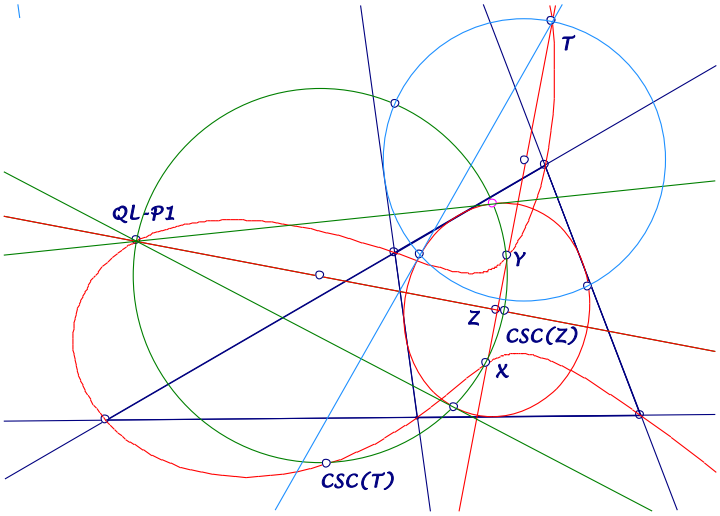
- The foci *X*, *Y* of the *Z*-centered inscribed conic lie on *QL-Cu1 CSC*-associated:
  … unipartite: The foci lie on the Schmidt Circle.
  The foci lie on the *CSC*-image of the main axis, that is the Thales circle $C_{1,1}$ about *QL-P1* and *CSC(Z)* (through *CSC(T)*).
  The foci lie on a circle $C_{1,2}$ round *CSC(Z)*, perpendicular to the Schmidt Circle.
  … bipartite: The foci lie on the 1st Steiner Axis.
  The foci lie on a circle $C_{2,1}$ round *T* perpendicular to the Schmidt Circle.
  The foci lie on a circle $C_{2,2}$ round *Z*, perpendicular to the Schmidt Circle.

- The circles $C_{1,1}$ and $C_{2,1}$ contain also the foci of the inscribed conic, centered in the intersection of *QL-L6* and the Newton Line (see *QL-2P2*).

- Tangents for *QL-Cu1* at the foci *X*, *Y*:
  … unipartite: The tangents at the foci *X*, *Y* intersect in *CSC(T)*.
  … bipartite: The tangents at the foci *X*, *Y* are parallel to the asymptote (parallel to *QL-L1*).

Further properties:

- The Thales circle about *QL-P1* and *CSC(Z)* (through *CSC(T)*) contains also the tangential points of *QL-P1* for the inscribed conic.



- The tangential points of *T* for the inscribed conic lie on a circle through *T* and the reflection of *CSC(T)* in the 1st Steiner Axis, centered …
  … unipartite: … on the main axis.
  … bipartite: … on the minor axis.

Eckart Schmidt
http://eckartschmidt.de
eckart_schmidt@t-online.de